SYSTEM AND METHOD FOR ACCESSING REMOTE SCREEN CONTENT

CROSS-REFERENCE(S) TO RELATED APPLICATION(S)

This application claims the benefit of U.S. Provisional Application No. 60/444,993, filed Feb. 3, 2003, priority from the filing date of which is hereby claimed under 35 U.S.C. § 120, and which is hereby incorporated by reference.

FIELD OF THE INVENTION

The present invention relates to computer graphics and, in particular, to techniques for accessing remote screen content on a computer graphics display.

BACKGROUND OF THE INVENTION

Accessing remote on-screen content from a current working location has become increasingly important with the emergence of various technologies, including large display devices, multiple display devices cooperatively displaying a single visual display area, pressure-sensitive display devices, and input devices such as pen- and touch-based devices, and other popular, nontraditional input devices. Previously, accessing remote content from a current working location typically involved moving a mouse a relatively short distance. However, with the emergence and convergence of these technologies, there are many times that a user cannot easily move a mouse, or manipulate another input device, to access the remote content. This is especially true when combining the movement of a cursor with a click-and-drag operation, typically requiring that a mouse button remain depressed for the entire movement operation. The following examples illustrate just a few of the scenarios where accessing remote content becomes a challenge.

Tablet devices are typically pen-based devices, where the display screen doubles as the input device. To select and drag an item on a tablet device, a user taps on the item, such as an icon, and, while maintaining pressure on the display device with the pen, drags the item to the desired location. Tablet devices typically have modestly sized display screens, but may be connected with an external display device to expand the display area, creating a single visual display area over multiple devices. This combination creates a single visual display area encompassing both the tablet's display screen and the external display screen. However, while the tablet's display is pen sensitive, the external display device typically is not. Thus, using a pen to click and drag an item from a working location on the tablet's pen-sensitive display to a remote location on the external display device cannot be easily accomplished.

Multiple touch-sensitive display devices similarly necessitate awkward user interactions to cross the physical boundaries of the display devices in order to navigate to a remote location. For instance, to drag an icon across the physical boundaries of multiple display devices requires numerous user manipulations, depending on the number of borders to cross. For example, using pen-based display devices, a user must drag the icon to a physical border and place it at least partially on the border. The user then must pick up the icon on the adjacent display device to continue its movement.

Alternative input devices, such as touchpads commonly found on notebook computers, are relatively small in relation to the notebook's display size. Due to the relatively small area of the touchpad, dragging an icon from a working area to a remote location on the screen typically requires the user to perform multiple drag operations to span the distance between the locations.

In addition to the above examples, computer systems with just one large display device, such as a wall-sized display device, and using a typical input device, such as a mouse, present difficulties in accessing remote content. As an icon is dragged from a working location to a remote area, the opportunities to accidentally drop the icon before reaching the targeted remote destination increase with the distance traveled, especially when the user must reposition the mouse on a mouse pad, or within the available movement space to continue its movement.

Several solutions for solving the problems related to accessing remote on-screen content have been proposed. One solution is to provide hardware that tracks the motion of the eye. While the eye is able to travel great distances and traverse physical boundaries, this solution requires additional, expensive hardware not readily available.

Another solution, not requiring specialized hardware, employs a technique involving "throwing" gestures. Using this technique, a user is able to accelerate an object, such as an icon, with a small "throwing" gesture. Once thrown, the object then continues its trajectory based on its inertia to a receptive target location, such as another icon. Unfortunately, the imprecision of human motor skills prevents this solution from being a reliable target-acquisition system. Difficulties also arise when there are multiple receptive targets along a trajectory path, in particular, determining which of the potential targets is the correct target.

Yet another solution involves predicting actions a user is likely to perform based on previous interactions or according to established rules. On-screen icons associated with those actions likely to be next performed by a user are relocated near the cursor and constantly track the cursor, relocating with the cursor, so that those icons are always close to the cursor. The predicted actions are updated based on the user's continued interaction. Unfortunately, constant tracking the cursor and relocating icons in response to cursor movements creates an ever-changing screen display. Organizing icons on a screen becomes nearly impossible as icons continually relocate according to cursor movements and predicted subsequent actions. Additionally, deviating from the predicted user interactions to remote content requires the user to navigate through a maze of predicted content.

As described in the previous examples, most current solutions for accessing remote content from a current working location involve moving from the current location to the remote content area. Additionally, most prior art solutions require the user to change working areas, rather than the remote content accommodating the user at the current working area. Those that do not, create organizational problems for screen content and are not easily adaptable to a one time deviation from a predicted pattern. While moving to the remote content location may be possible using indirect input devices, such as a mouse, it is very difficult or not possible when the user is limited to direct input devices, such as a pen on a pressure sensitive display. What is needed is a system and method for accessing remote content by temporarily displaying remote content in the proximity of the working area. Additionally, the system and method should temporarily display the remote content in the proximity of the working area only in response to a user's gesture indicating that the remote content should be temporarily relocated.